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Indian Standard

OILSEEDS MILLING MACHINERY — POWER GHANIES PORTABLE — SPECIFICATION

UDC 665·1·05·061·34·83·182·4

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BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

August 1993 **Price Group 4**

AMENDMENT NO. 1 JANUARY 1996
TO
IS 13794 : 1993 OILSEEDS MILLING MACHINERY — POWER GHANIES, PORTABLE — SPECIFICATION

(*Page* 1, *clause* 3.1, *Table* 1) — **Substitute the following for the existing:**

Table 1 Material of Construction of Various Components
(*Clause* 3.1)

Sl No.	Assembly	Component	Material	IS No.
(1)	(2)	(3)	(4)	(5)
i)	Base frame	Base frame	Mild steel (channel)	2062 : 1992
		Top sheet	Mild steel (sheet)	do
ii)	Main housing	Housing	Cast iron	210 : 1993
		Housing cover	do	do
		Bottom plate	do	do
		Crown gear flange	do	do
		Spindle	Mild steel (bar)	2062 : 1992
		Grease tray	Mild steel (sheet)	do
iii)	Pinion housing	Housing	Cast iron	210 : 1993
		Housing cover	do	do
		Drive pulley	do	do
		Shaft	Mild steel (bar)	2062 : 1992
iv)	GHANI drum	Drum	Mild steel (sheet)	2062 : 1992
		Dunka	do	do
		Dunka hook	do	do
		Crowbar	do	do
		Facher	Seasonal wood	1141 : 1973
v)	Pestle	Housing	Cast iron	210 : 1993
		Cover	do	do
		Pestle cap	do	do
		Pressure screw	Mild steel (bar)	2062 : 1992
		Pestle	Seasonal wood	1141 : 1973
		Pestle spring	Steel wire	4454 (Part 2) : 1984
		Pins	Carbon steel	1570 (Part 2) : 1979
vi)	Vertical stand	Vertical stand	Mild steel	2062 : 1992
		Roller bracket housing	do	do
vii)	Bracket	Roller bracket	do	2062 : 1992
		Rollers	do	do
		Pins	Carbon steel	1570 (Part 2) : 1979

Table 1 (*Concluded*)

Sl No.	Assembly	Components	Material	IS No.
(1)	(2)	(3)	(4)	(5)
viii)	Counter shaft	Pedestal	Cast iron	210 : 1993
		Counter pulley	do	do
		Counter shaft	Mild steel (bar)	2062 : 1992
ix)	Oil tray	Oil tray	Cold rolled steel sheet	513 : 1986
x)	Oil cake scrapper	Vertical post	Mild steel (tube)	3601 : 1984
		Base for post	Mild steel (plate)	2062 : 1992
		Brackets	Mild steel	do
xi)	Guard	Guards	Mild steel	do
xii)	Starter box	Box	Teak wood	—
		Clamp	Mild steel	2062 : 1992

(*Page* 1, *clause* 4, *third line*) — Substitute 'IS 1586 : 1988' *for* 'IS 1586 : 1968'.

(*Page* 3, *clause* 5.7, *second line*) — Delete '(*see* IS 5124 : 1989)'.

(*Page* 5, *Annex* A) — Substitute the following for the existing:

'ANNEX A

(*Clause* 2)

LIST OF REFERRED INDIAN STANDARDS

IS No.	*Title*
210 : 1993	Specification for grey iron castings (*fourth revision*)
513 : 1986	Cold rolled low carbon steel sheets and strips (*third revision*)
1141 : 1973	Code of practice for seasoning of timber (*first revision*)
1570 (Part 2/ Sec 1) : 1979	Schedules for wrought steels: Part 2 Carbon steels (unalloyed steels), Section 1 Wrought products (other than wire) with specified chemical composition and related properties (*first revision*)

IS No.	*Title*
1586 : 1988	Method for rockwell hardness test for metallic materials (Scales A, B, C, D, E, F, G, H, K) (*second revision*)
2062 : 1992	Steel for general structural purpose (*fourth revision*)
3579 : 1966	Methods of test for oilseeds
3601 : 1984	Steel tubes for mechanical and general engineering purposes (*first revision*)
4427 : 1967	Grading for groundnut kernels for oil milling and for table use
4428 : 1967	Grading for seasame seeds for oil milling
4454 (Part 1) : 1981	Steel wires for cold formed springs : Part 1 Patented and cold drawn steel wires — Unalloyed (*second revision*)
7874 (Part 1) : 1975	Methods of tests for animal feeds for feeding stuffs : Part 1 General methods'

(*Page* 6, *clause* **B.2.2**, *eighteenth line, last word*) — Substitute 'add' *for* 'and'.

(FAD 51)

Reprography Unit, BIS, New Delhi, India

Agricultural Produce Milling Machinery Sectional Committee, FADC 39

FOREWORD

This Indian Standard was adopted by the Bureau of Indian Standards, after the draft finalized by the Agricultural Produce Milling Machinery Sectional Committee had been approved by the Food and Agriculture Divisional Council.

Oilseed is one of the major industries in the country. The main machinery employed in the process of milling and extracting oilseeds consists of animal or power driven GHANIES, expellers and solvent extraction plants. Animal drawn GHANIES have been the traditional oil milling machinery but are time consuming and leaving more oil in the residual cakes. A number of organizations have been working to improve the efficiency of the GHANIES utilizing engines and motors as a source of power instead of animals. Power GHANIES with improved extraction efficiency have been developed and now largely being manufactured and used in the country. A need was, therefore, felt to formulate this standard to stipulate the quality parameters.

In formulation of this standard, considerable assistance has been derived from Directorate of Village Oil industries, Khadi and Village Industries Commission, Bombay.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS 2 : 1960 'Rules for rounding off numerical values (*revised*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Indian Standard

OILSEEDS MILLING MACHINERY — POWER GHANIS, PORTABLE — SPECIFICATION

1 SCOPE

This standard covers the material, dimensions, performance and other requirements of portable power GHANIES of drum rotating type.

2 REFERENCES

The Indian Standards listed in Annex A are necessary adjuncts to this standard.

3 MATERIAL

3.1 The material of construction of various components of the GHANIES (*see* Fig. 1) shall be as given in col 4 of Table 1. The material may conform to the relevant Indian Standard given in col 5 of Table 1.

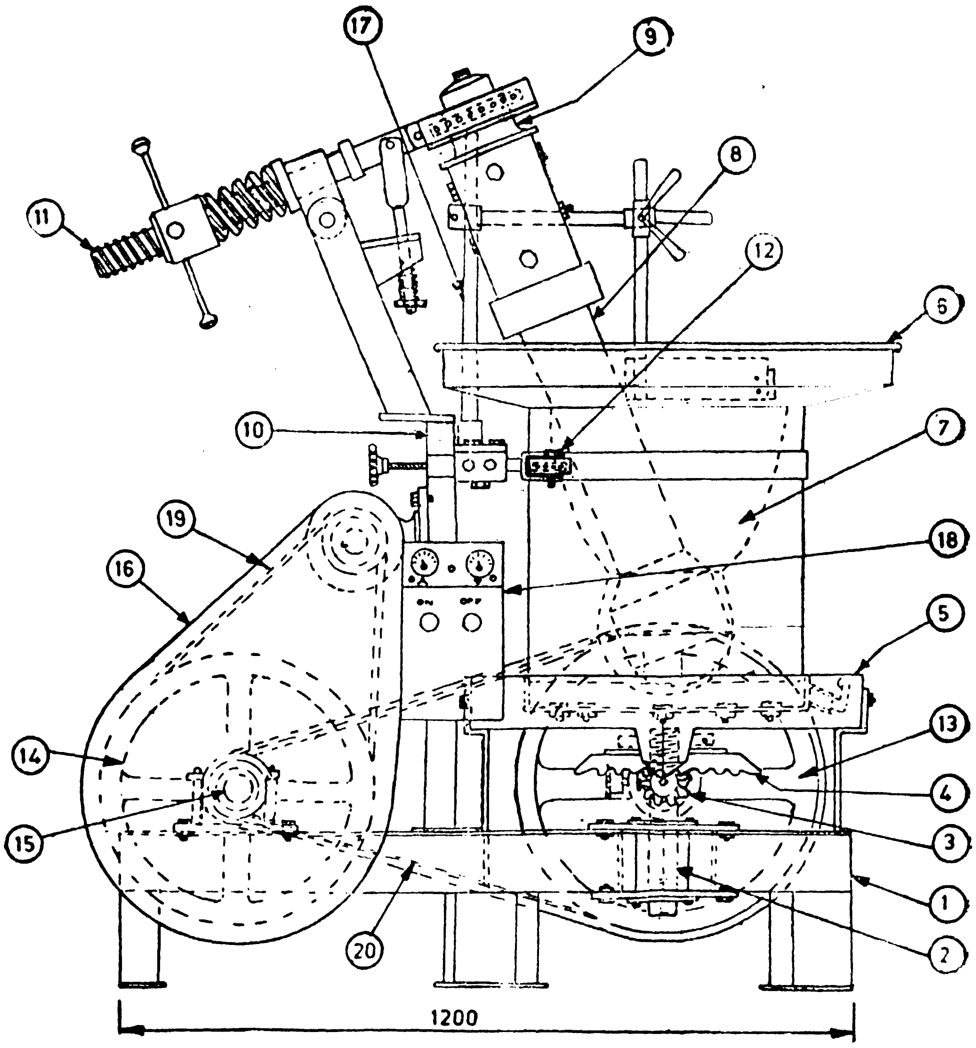
4 HARDNESS

Keys and springs used at various locations shall have hardness of 52 to 57 and 65 to 68 HRC (*see* IS 1586 : 1968) respectively. The crown gear teeth and pinion teeth shall be hardened to have the hardness of 60 to 65 HRC.

Table 1 Material of Construction of Various Components

(*Clause* 3.1)

Sl No. (1)	Assembly (2)	Components (3)	Material (4)	IS No. (5)
i)	Base frame	Base frame	Mild steel (channel)	2062 : 1984
		Top sheet	Mild steel (sheet)	2062 : 1984
ii)	Main housing	Housing	Cast iron	210 : 1978
		Housing cover	Cast iron	210 : 1978
		Bottom plate	Cast iron	210 : 1978
		Crown gear flange	Cast iron	210 : 1978
		Spindle	Mild steel (bar)	2062 : 1984
		Grease tray	Mild steel (sheet)	2062 : 1984
iii)	Pinion housing	Housing	Cast iron	210 : 1978
		Housing cover	Cast iron	210 : 1978
		Drive bulley	Cast iron	210 : 1978
		Shaft	Mild steel (bar)	2062 : 1984
iv)	GHANI drum	Drum	Mild steel (sheet)	2062 : 1984
		Dunka	Mild steel (sheet)	2062 : 1984
		Dunka hook	Mild steel (sheet)	2062 : 1984
		Crowbar	Mild steel (sheet)	2062 : 1984
		Facher	Seasonal wood	1141 : 1973
v)	Pestle	Housing	Cast iron	210 : 1970
		Cover	Cast iron	210 : 1970
		Pestle cap	Cast iron	210 : 1970
		Pressure screw	Mild steel (bar)	2062 : 1984
		Pestle	Seasonal wood	1141 : 1973
		Pressure spring	Steel wire	4454 (Part 2) : 1981
		Pins	Carbon steel	1570 (Part 2) : 1979
vi)	Vertical stand	Vertical stand	Mild steel	2062 : 1984
		Roller bracket housing	Mild steel	2062 : 1984
vii)	Bracket	Roller bracket	Mild steel	226 : 1975
		Rollers	Mild steel	226 : 1975
		Pin	Carbon steel	1570 (Part 2) : 1979
viii)	Counter shaft	Pedestal	Cast iron	210 : 1978
		Counter pulley	Cast iron	210 : 1978
		Counter shaft	Mild steel (bar)	226 : 1975
ix)	Oil tray	Oil tray	Cold rolled steel sheet	513 : 1986
x)	Oil cake scrapper	Vertical post	Mild steel (tube)	3601 : 1984
		Base for post	Mild steel (plate)	226 : 1975
		Brackets	Mild steel	226 : 1975
xi)	Guard	Guards	Mild steel	226 : 1975
xii)	Starter box	Box	Teak wood	226 : 1975
		Clamp	Mild steel	226 : 1975



LIST OF COMPONENTS OF POWER GHANI, PORTABLE

1. Base frame	11. Pressure screw
2. Main housing	12. Roller assembly
3. Pinion housing	13. Pinion drive pulley
4. Crown grear	14. Counter shaft pulley
5. Oil tray	15. Counter shaft
6. GHANI drum	16. Pinion pulley guard
7. Facher	17. Vertical post for scrapper
8. Pestle	18. Starter box
9. Pestle cap	19. V-belt
10. Vertical stand	20. V-belt

All dimensions in millimetres.

FIG. 1 POWER GHANI, PORTABLE — MASTER ASSEMBLY

5 CONSTRUCTIONAL REQUIREMENTS

5.1 Base Frame

It shall be provided with the specific locations for fitting/positioning of various components. The top plate shall be welded with the channel on the top portion. The slots shall be provided at the place of fitting of pinion housing and the countershafts. The square blocks shall be welded at the exact position in opposite direction for arresting the movement of housing and pedestal. The frame shall be welded with legs to keep the base above the ground level.

5.2 Main Housing Assembly

Bearings shall be fitted with the help of sleeves. Two grooves shall be provided for easy removal of the sleeves. Hole shall be provided for fitting grease nipples. Provision shall be made in the top portion of the spindle for inserting the keys for locking the fitting with the flange. The flange shall have the provision for fitting a suitable crown gear which would permit drum rotation of 11 rpm.

5.3 Pinion Housing

It shall be provided with the seating arrangement for fitting the bearings. Upper portion shall be cylindrical in shape with an integral flange plate casted with the housing. Hole shall be provided for fitting the assembly with the base frame. The pinion drive pulley shall be statically balanced. While fitting the pulley with the shaft the slot shall be aligned so that the wheel will not become free. Grease cups/nipples shall be provided at suitable locations.

5.4 GHANI Drum Assembly

The drum shall be cylindrical in shape in which facher shall be fitted. Base of the drum shall be welded with a ring. The inside of the ring shall be machined so as to align it with the spigot provided in the crown gear flange. Base plate of the drum shall be leak-proof and shall be welded on the top of the ring. The top of the drum shall be welded with the tray which works as recepticle for the oilseeds at the time of extraction. Dunka to block the drainage pipe at the time of extraction and to clear the clogging of the drainage hole shall be fitted. Crowbar, for removal of oil cakes and stirring at the time of extraction of oil, shall be provided. Facher shall consist of three pieces of wood (two halves and a wedge inserted in between the two big halves). Proper inclination of the pestle and the side cavity of the facher shall be made. The evenness of the facher shall be ensured at the time of the fitting of the GHANI. The facher shall be provided with the hole for draining out the oil.

5.5 Pestle Assembly

The pestle, pipe and pressure springs shall be manufactured in such a way that the pressure is exerted on the centre of pestle.

5.6 Vertical Stand Assembly

Tappered hole shall be provided for locking brakes. Assembly shall be properly reinforced since much load will be passed on it during the operation of the GHANI. Provision shall be made for fitting the prime mover. The bottom legs of the stand shall be welded with a plate. Holes shall be provided for fitting assembly with base frame.

5.7 Starter Box Assembly

It shall have the provision to fit a direct line three phase starter (*see* IS 5124 : 1989) for electric operated systems.

6 DIMENSIONS

The dimensions of the pestle and facher (including crow bar) shall be as given in Fig. 2 and 3 respectively.

7 PERFORMANCE REQUIREMENTS

7.1 When tested in accordance with **B-1**, the GHANI shall not indicate the following:

a) Undue noise from any component,
b) Loosening of fasteners,
c) Slippage of the belt, and
d) Undue vibration.

7.2 When tested in accordance with **B-2**, the GHANI shall be able to extract minimum 88 percent of oil content of the oilseeds and visual observations shall not indicate the following:

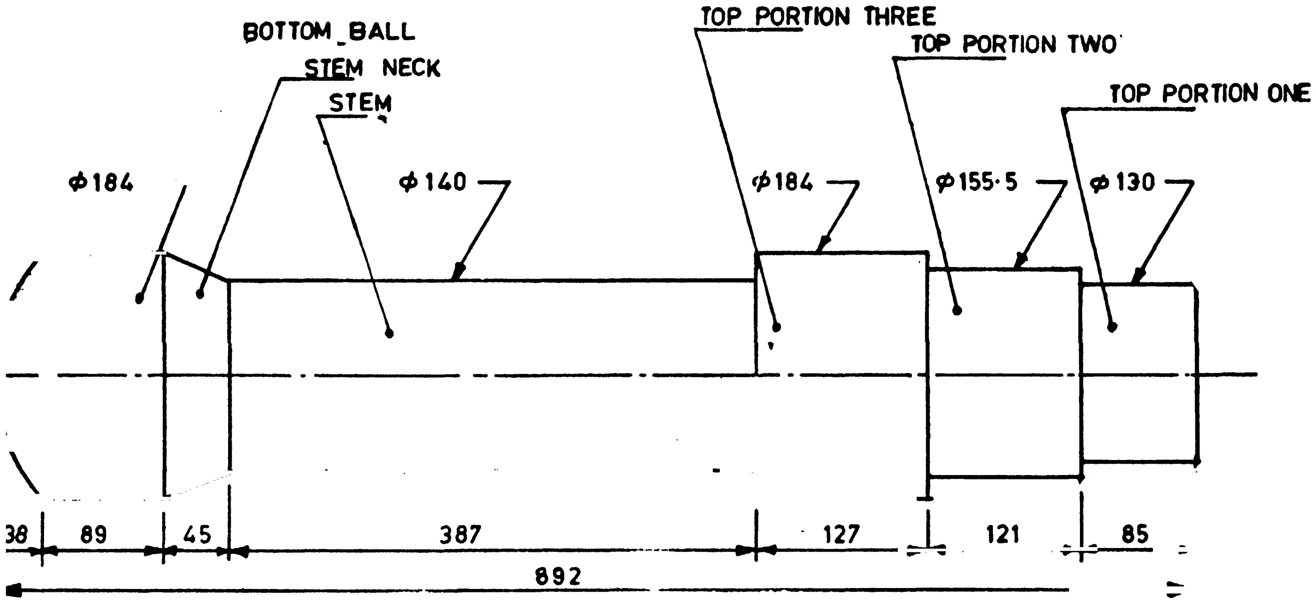
a) The observations mentioned at **7.1** (a to d),
b) Tension screw in tight position after the cake formation,
c) Leakage and clogging of the oil in the assembly, and
d) Constant jerk in the pressure mechanism after the cake formation.

8 OTHER REQUIREMENTS

8.1 The axle shall be finished to close tolerances at the bearings and these shall be properly aligned.

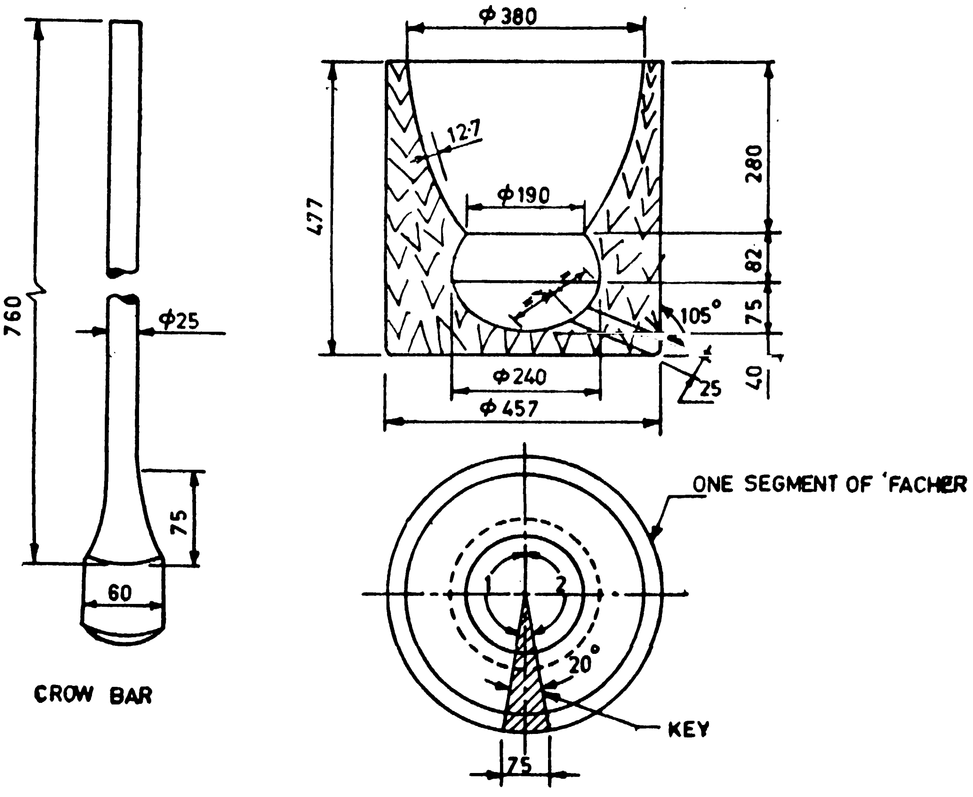
8.2 Provisions shall be made for lubrication of bearings and other moving parts.

8.3 Operational and maintenance manual along with safety instruction shall be supplied by manufacturer.



All dimensions in millimetres.

FIG. 2 WOODEN PESTLE



All dimensions in millimetres.

FIG. 3 FACHER

8.4 The components of the GHANI shall be free from cracks, pits, holes and other visual defects which may be deterimental for their use.

8.5 Welding shall not be porous and shall be smooth.

8.6 Metallic components shall be provided with the rust preventive painting.

9 MARKING AND PACKING

9.1 Marking

Each GHANI shall be marked with the following particulars:

a) Indications of source of manufacture;
b) Batch, code or serial number;
c) Power rating; and
d) Capacity.

9.1.1 *Standard Mark*

Each GHANI may also be marked with standard mark.

9.2 Packing

The packing of the GHANI or its components shall be done as agreed to between the purchaser and supplier for safe handling in transit.

ANNEX A

(*Clause* 2)

LIST OF REFERRED INDIAN STANDARDS

IS No.	*Title*
210 : 1978	Specification for grey iron castings (*third revision*)
226 : 1975	Specification for structural steel (standard quality) (*fifth revision*)
513 : 1986	Cold rolled low carbon steel sheets and strips (*third revision*)
1141 : 1973	Code of practice for seasoning of timber (*first revision*)
1570 (Part 2/Sec 1) : 1978	Schedules for wrought steels : Part 2 Carbon steels (unalloyed steels), Section 1 Wrought products (other than wire) with specified chemical composition and related properties (*first revision*)
1586 : 1968	Method for rockwell hardness test for metallic materials (Scales A, B, C, D, E, F, G, H, K) (*second revision*)
2062 : 1984	Weldable structural steel (*third revision*)
3601 : 1984	Steel tubes for mechanical and general engineering purposes (*first revision*)
4454 (Part 1) : 1981	Steel wires for cold formed springs : Part 1 Patented and cold drawn steel wires — unalloyed (*second revision*)
5124 : 1969	Code of practice for installation and maintenance of ac induction motor starters (voltage not exceeding 1 000 V)

ANNEX B

(*Clause* 7.1)

METHODS OF TEST FOR GHANIES

B-1 TEST AT NO LOAD

B-1.1 GHANI shall be installed on level and preferably on hard surface. All the adjustments shall be made in accordance with the manufacturers' recommendations.

B-1.2 GHANI shall be attached with a suitable prime mover preferably with an electric motor and a voltage stabilizer. An energy meter or some form of transmission dynamometer shall be fitted. The power delivered to the GHANI may be supplied in the following ways:

a) Direct coupling of the prime mover with the main shaft of the GHANI; and

b) Connecting the prime mover with the help of a flat or V-belt and pulley with the main shaft of the GHANI.

B-1.2.1 In case of (a), the power delivered to the GHANI would be the power output of the prime mover : whereas in case of (b), the allowances for flat and V-belt drive losses may be taken at 6 and 3 percent respectively.

B-1.3 GHANI shall be run-in without load before commencing the tests. The running in shall be carried out in accordance with the manufacturer's recommendation. In the absence of any recommendation by the manufacturer, the GHANI shall be run-in for 30 minutes. During the period of run-in, adjustments done shall be in accordance with the instructions contained in the manual supplied by the manufacturer.

NOTE — Manufacturers should indicate the power requirement of the GHANI.

B-1.4 Loose the nut of the tension screw to the maximum lowest limit (for example, the spring should not have any tension at all at the time of starting the GHANI). See that the rollers are touching with drum roller band by adjusting the screw wheel provided for that purpose. Allowable gap in any one point is ±2 mm. After proper adjustment of the roller bracket, secure, it firmly with the help of bolts provided in the supporting brackets of the vertical stand. Before putting the pestle inside the facher again ensure the alignment of the pestle and facher at the bottom.

B-1.5 After completing the above operations and keeping the GHANI empty, start the motor. Keep all the springs loose and run for 30 minutes at the specified speed. The visual observations of the GHANI shall not indicate the following:

a) Undue noise from any component,

b) Loosening of fasteners,

c) Slippage of the belts, and

d) Undue vibration.

B-2 TEST AT LOAD

B-2.1 Test Material

Sufficient quantity of the oilseed preferably groundnut or mustard (*see* IS 4427 : 1967 or IS 4428 : 1967) shall be taken. The presence of foreign matter, moisture content, oil content, and acid value of extracted oil shall be determined in accordance with IS 3579 : 1966.

B-2.2 Operation

Keep all the spring loose. Switch on the GHANI. Sprinkle a handful of water on the upper part of the facher and pestle and gradually pour the seed into the facher up to one third quantity and the **remaining** two third quantity spread over on the tray of the GHANI. Ascertain the total quantity of the water to be added (for a new seed it is generally done on trial and error basis). Generally water required ranges from 3 to 6 percent in respect of coconut, sunflower, etc, and 6 to 10 percent in respect of other oilseeds on the basis of the total mass of the seeds taken per day. Out of the total quantity of water, sprinkle approximately 20 percent water immediately after the seeds are poured into the GHANI and gradually mix it with hand while the GHANI is working. When the seeds get pulverised gradually and the remaining seeds. Feeding of large quantity would push the pestle to vertical position resulting in a premature heavy load on the motor. This shall be ascertained with the help of an ammeter. When the empty GHANI works, the ammeter should show 1 amp to 1·5 amp and when the GHANI is loaded, it should show 2 to 2·5 amp. At the initial stage of operation the ammeter reading should be within 2·5 amp. If the reading goes beyond that limit remove the excess load by removing the seeds from the pit and feed the same uniformally. After feeding the seed and ascertaining the pulverisation of seeds, add 70 percent of water and fit the scrapper in position. After adding the water the load on the pressure mechanism will develop automatically.

B-2.2.1 Through out this initial processing neither tightening of the pressure spring nor the tension screw should be done. In the initial stage before pulverisation of seeds, the tension screw spring will become tight due to the change of the angle of the pestle. Once the process of pulverisation starts, the tension on the spring will gradually reduce. Only nominal tension should remain in the tension spring. When the full quantity of water is added in the seed meal after pulverisation, the cake formation starts and gradually the load will increase in the GHANI. This shall be ascertained by the change of the humming sound of the motor.

B-2.2.2 At this stage stir the seed meal with the help of crow bar. The scraper shall ensure regular and even flow of the seed meal in the pit. The ammeter should show current reading in the range of 2·5 to 3 amps. At this stage check up the quantity/volume of water added is sufficient or by taking the meal in the hand and making it into a ball. If the water added is adequate then the ball is well formed with impression of fingers over it and it should be easily breakable with mild pressure. The meal should crumbles as soon as the finger pressure is released in both the cases under watering and the over watering. Check the hardness of the formation of the cake in the side portion of pit with the help of crow bar. At this stage, oil should start ooze out in front of the pestle and cake sticks on the surface of the facher (during initial feeding this stage takes about 30 to 40 minutes and gradually decreases up to 20 minutes in the subsequent feedings).

B-2.2.3 Ensure feeding of the oilseed meal, regulated by the scrapper. Once or twice, stir the meal with crow bar to absorb the sediments in the cake. Release the pressure in case when ammeter goes beyond 4 amps. Once the oil is collected up to the brim of the facher lift the scrappers slightly higher than the facher level and fix it, so that the feeding of the cake into the GHANI is stopped and the oil gets clarified. Run the GHANI at this condition for two minutes. After ensuring the clarity of the oil, switch off the Ghani and bring the oil drainage exactly to the oil outlet of the oil tray and remove the dunka. While removing the dunka twist the handle side ways two or three time to clear the opening insides the GHANI and take the dunka out and switch on the GHANI. Now fix the scrapper again in its position. The scrapper should be fixed in such a way that the cutter in the bottom of the scrapper cuts the cake and pushes it inside the pit evenly.

B-2.2.4 At this stage do not venture to feed the cake by hand because feeding may not be even due to which uneven pressure may develop which will result on overloading on the motor. Now apply full pressure on the pressure mechanism. While giving pressure, ensure some gap in between the coils of the spring to have flexibility. At this stage, the feeding should be gradual and even. Ensure the feeding by scrapper in such a way that the ammeter reading does not go beyond 4 amps. This shall be achieved by adjusting the scrapper slightly higher than the top level of the facher. Now sprinkle the remaining water on the cake to have the last droplets of the extractable oil.

B-2.2.5 Before finally stopping the GHANI put the dunka in its position. Release the tension in the pressure mechanism and allow the GHANI to rotate for 2 minutes and then stop the GHANI. This two minutes rotation of the GHANI will help in loosening the cake from the surface of the facher for easy removal of the cake. Now remove the oil cake from the GHANI. While removing the oil cake use the crow bar carefully so that the sharp edge does not damage the facher especially at the neck line of the socket. Leave some quantity of cake remains at the bottom edge of the neck line.

B-2.3 The oil content in the residual cake and acid value of the oil obtained after milling shall again be analysed. Oil content shall be determined in accordance with IS 7874 (Part 1) : 1975.

B-2.4 The procedures described in **B-2.2** to **B-2.3** shall be repeated five times to estimate the percentage of extraction of oil.

Standard Mark

The use of the Standard Mark is governed by the provisions of the *Bureau of Indian Standards Act, 1986* and the Rules and Regulations made thereunder. The Standard Mark on products covered by an Indian Standard conveys the assurance that they have been produced to comply with the requirements of that standard under a well defined system of inspection, testing and quality control which is devised and supervised by BIS and operated by the producer. Standard marked products are also continuously checked by BIS for conformity to that standard as a further safeguard. Details of conditions under which a licence for the use of the Standard Mark may be granted to manufacturers or producers may be obtained from the Bureau of Indian Standards.

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BUREAU OF INDIAN STANDARDS

Headquarters:

Manak Bhavan, 9 Bahadur Shah Zafar Marg, New Delhi 11002
Telephones : 331 01 31, 331 13 75

Telegrams : Manaksanstha
Common to all Offices)

Regional Offices :	Telephone
Central : Manak Bhavan, 9 Bahadur Shah Zafar Marg NEW DELHI 110002	331 01 31 331 13 75
Eastern : 1/14 C. I. T. Scheme VII M, V. I. P. Road, Maniktola CALCUTTA 700054	37 84 99, 37 85 61 37 86 26, 37 86 62
Northern : SCO 445-446, Sector 35-C, CHANDIGARH 160036	53 38 43, 53 16 40 53 23 84
Southern : C. I. T. Campus, IV Cross Road, MADRAS 600113	235 02 16, 235 04 42 235 15 19, 235 23 15
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